



4) Fusicoccin induced stomatal movement:-

The studies of fusicoccin on ion transport  $H^+$  or  $K^+$  ion has helped to understand the role of cations in stomatal opening. This compound increase secretion of proton and  $K^+$  uptake in plant tissues. Fusicoccin stimulates uptake of movement ions. Such Rubidium  $Na^+$ ,  $Cs^+$   $K^+$  in high salt concs medium.

At low salt concs uptake of  $K^+$  ion is much greater than  $Na^+$  and other cations. It indicates that fusicoccin enhances the selectivity of the transport system for  $K^+$ . The transport of  $K^+$  ion into guard cells, increase it's O.P the guard cells becomes turgid by taking water from the neighbouring cells, the stomata opens.

## ⑤ Cyclic photophosphorylation and Stomatal movement

Das and Raghunatha - 1974 have studied Commelina benghalensis and Petunia hybrida. They demonstrated the key role of cyclic photophosphorylation in causing the opening of stomata even under unfavourable conditions. They have shown that guard cells chloroplast have a highly functional mechanism for the production of ATP through cyclic photophosphorylation. These chloroplast have been found to show low state of thylakoid reaction and non-cyclic photophosphorylation but high state of cyclic photophosphorylation.

## ⑥ Calcium - ABA second messenger model:

The calcium ions inhibits stomatal opening and they can move rapidly from shoot to shoot in xylem (Desilva and co-workers-1985) Mansfield and Alkimson - 1990

Mansfield suggested a hypothesis that an ABA induced increase in cytosolic free  $Ca^{2+}$  acts to trigger for the intercellular mechanism responsible for stomatal closure. The presence of high affinity proteinaceous ABA binding sites is located on the plasma-membrane permeability which may result either the activation of inwardly directing  $Ca^{2+}$  channels in the plasma membrane allowing the influx of  $Ca^{2+}$  ions into the cytosol or the release of  $Ca^{2+}$  ions from the internal stores stimulated by a secondary messenger. The inhibition of opening occurs due to inwardly directed  $K^{+}$  ions where as stomatal closure occurs due to  $Ca^{2+}$  mediated release of anions and cations.